

NSD GRADEL FUSION

Internship

(Gradel Internship 3-4 months)

Design of an Advanced Electric Propulsion System that Utilizes Fusion Products for Exhaust Plasma Enhancement

The NSD-Gradel-Fusion Department of Gradel sàrl has three high-tech product and research lines:

- 1) nuclear fusion based neutron generators;
- 2) space propulsion devices;
- 3) kinetic plasma code.

Both the neutron generator devices and the plasma thrusters use the same working principles to generate and confine plasma.

In a previous work we have studied the thermalization process of charged fusion products in a hypothetical plasma thruster that has the dimensions of Gradel's neutron generators. These studies showed that the energy transferred from the fusion products to the plasma is marginal – it needs larger thruster sizes to improve this.

In the upcoming study we want to broaden the parameter space such that the energy transfer rate between fusion products and background plasma is an input value defining a fusion system size with significant energy recovery through collisional processes before the product ions leave the system (to produce thrust for space applications).

The tool to be used in this study is a self-developed kinetic Fokker-Planck solver which, on basis of existing literature, belongs to the most advanced solvers known. Supervision is provided by the team which is highly international and technically as well as scientifically leading.

Dejan Petkow (Dr.-Ing.)

Head of NSD Department
(Neutron Generators, Space Propulsion, Plasma Modelling)

Gradel sàrl
6, Z.A.E. Le Triangle Vert, L-5690 Ellange, Luxembourg
E: d.petkow@gradel.lu